

REMARKS

Applicants have amended the specification to correct minor typographical errors, have amended FIG. 1A to correct a reference number error, and have amended claims 1, 8-14, 26, 27, 35, 36, 40, 42, 44-47, 49, and 51 for the reasons set forth below. No new matter has been added by these amendments. In view of these amendments and the foregoing remarks, Applicants hereby respectfully request reconsideration of the application, and allowance of claims 1-52.

The Office has rejected claims 1-44 under 35 U.S.C. 102(a) as being anticipated by U.S. Patent No. 6,055,220 to Mamin et al ("Mamin"). The Office asserts that Mamin discloses in FIGS. 2, 3 and 9 a hemispherical solid immersion lens SIL including a coating layer of silicon nitride, a structure 210 partially in and adjacent to a surface of the optical element, and a source of light that provides beam 204 with a mode profile providing an electric field having a vector component perpendicular to a surface of the optical element. The Office asserts that the light source is positioned to propagate light through the optical element onto a magneto-optical disk 1. The Office also asserts that the structure 210 enhances the electric field of the light which optically interacts with the object.

Mamin does not disclose or suggest, "at least one structure at least partially in a non-opaque portion of the optical element and at least adjacent a surface of the optical element" as recited in claim 1, "providing an optical element with at least one structure at least partially in a non-opaque portion of the optical element and at least adjacent to a surface of the optical element" as recited in claim 14, "a structure at least partially in a non-opaque portion of the optical element and at least adjacent a surface the optical element" as recited in claim 27, or "forming at least one opening in a non-opaque portion of the optical element and adjacent a surface of the optical element . . . depositing a material in the at least one opening to form a structure" as recited in claim 36.

The Office's attention is respectfully directed to FIGS. 9 and 10A-10E and to col. 7, lines 5-6 in Mamin which illustrate and disclose that the scatterer 210 is embedded in the opaque layer of SiN, not in the solid immersion lens SIL. Additionally, the Office's attention is respectfully directed to col. 6, lines 62-66 in Mamin which discloses that the layer

Amendment to the Drawings:

Attached is a replacement sheet for the drawings. Applicants have amended FIG. 1A to change 10 to 10(1). Support for this amendment can be found in paragraphs 26 and 27 of the above-identified patent application. No new matter has been added by way of this amendment.

of SiN is opaque to incident light and to col. 6, line 66 to col. 7, line 1, in Mamin which discloses that the optical properties of the opaque layer of SiN are irrelevant to the optical performance of the solid immersion lens SIL. Accordingly, not only does the scatterer 210 not extend into any non-opaque portion of the solid immersion lens SIL, but contrary to the Office's assertions the opaque layer of SiN is irrelevant to the optical performance of the solid immersion lens SIL and thus does not form part of the solid immersion lens SIL.

As described in paragraph 10 of the above-identified patent application, the present invention is able to increase the resolution of near field optical imaging by a factor of two to five beyond that achieved with prior techniques. As described in paragraph 36 of the above-identified patent application, this improvement is possible because of the structure that is at least partially in a non-opaque portion of the optical element and at least adjacent a surface the optical element which makes possible a highly localized interaction with the surface of an adjacent object. Accordingly, in view of the foregoing amendments and remarks, the Office is respectfully requested to reconsider and withdraw the rejection of claims 1, 14, 27, and 36. Since claims 2-13 depend from and contain the limitations of claim 1, claims 15-26 depend from and contain the limitations of claim 14, claims 28-35 depend from and contain the limitations of claim 27, and claims 37-44 depend from and contain the limitations of claim 36, they are distinguishable over the cited references and patentable in the same manner as claims 1, 14, 27, and 36.

Mamin does not disclose or suggest, "wherein the structure protrudes out past the surface of the optical element" as recited in claim 7, "wherein the structure protrudes out past the surface of the optical element" as recited in claim 20, "wherein the structure protrudes out past the surface of the optical element" as recited in claim 29, or "wherein the structure protrudes out past the surface of the optical element" as recited in claim 38. Contrary to the Office's assertion that the tip of the scatter 210 does not extend beyond the surface of layer of SiN. The Office's attention is respectfully directed to FIGS. 9 and 10F in Mamin, which if a straight line is placed across the upper surface of the layer of SiN, clearly illustrate that the tip of the scatter 210 does not extend beyond the surface of layer of SiN. Additionally, nowhere does Mamin disclose or suggest having the scatterer 210 extend beyond the top surface of the layer of SiN. As described in paragraph 32 of the above-

identified patent application, with the protruding structure a highly localized interaction with the surface of the adjacent object is enabled and resolution of near field imaging down to about 10 nm can be achieved. Accordingly, in view of the foregoing amendments and remarks, the Office is respectfully requested to reconsider and withdraw the rejection of claims 7, 20, 29, and 38.

Mamin does not disclose or suggest, “wherein at least a portion of the opening has a conical shape and wherein the sides of the conical portion are substantially straight” as recited in claim 13, “wherein at least a portion of the opening has a conical shape and wherein the sides of the conical portion are substantially straight” as recited in claim 26, “wherein at least a portion of the opening has a conical shape and wherein the sides of the conical portion are substantially straight” as recited in claim 35, or “wherein the forming the opening further comprises forming at least a portion of the opening to have a conical shape and wherein the sides of the conical portion are substantially straight” as recited in claim 44. The Office’s attention is respectfully directed to FIGS. 9 and 10A-10F in Mamin, which clearly illustrate that the opening formed in the layer of SiN for the scatterer 210 has a rounded shape. Mamin does not disclose or suggest an opening with a conical portion where the sides are substantially straight.

As shown in FIGS. 6D and 6E in the above-identified patent application, with at least a portion of the opening having a conical shape where the sides of the conical portion are substantially straight is used to form the structure which comes to a tip. With this structure in the optical element, an increase in resolution of near field optical imaging down to about 10 nm can be achieved. Accordingly, in view of the foregoing amendments and remarks, the Office is respectfully requested to reconsider and withdraw the rejection of claims 13, 26, 35, and 44.

The Office has rejected claims 45, 48-50, and 52 under 35 U.S.C. 102(a) as being anticipated by Mamin and has rejected claims 45, 47-49, and 51-52 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 4,955,685 to Garman (“Garman”). The Office asserts that Garman discloses in FIG. 3 an elliptical reflector 69, a doped fiber 60 positioned to interact with the elliptical reflector 69, and a source of light 68 at col. 4 line 66 -

col. 5 line 8, with a mode profile providing an electric field having a vector component perpendicular to a surface of the optical element. The Office asserts that the optical element 69 focuses at least a portion of the light onto the structure 60 which enhances the electric field of the light which interacts with an external fiber of the communication system, at least by virtue of the fact that its doping enables light amplification.

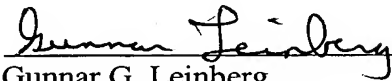
Neither Mamin nor Garman, alone or in combination, disclose or suggest, “the structure focusing at least a portion of the light on to at least a portion of the elliptical shaped mirror, the elliptical shaped mirror focusing the at least a portion of the light on to at least another portion of the structure enhancing the electric field of the light which optically interacts with an adjacent object” as recited in claim 45 or “directing light with a mode profile with at least a portion of the structure on to at least a portion of the elliptical shaped mirror, the elliptical shaped mirror focusing the light on to at least another portion of the structure enhancing the electric field of the light which optically interacts with an adjacent object” as recited in claim 49. Applicants have amended claims 45 and 49 to recite that the optical element is at least one elliptical shaped mirror. As the Office has acknowledged by excluding dependent claims 49 and 51 from rejection based on Mamin, Mamin does not disclose or suggest an elliptical shaped mirror in the system and method as claimed. The Office’s attention is FIG. 3 and to col. 4, line 66 to col. 5, line 8 in Garman, which illustrates and discloses that the light source 68 provides the optical energy to pump the lasing material doped into the optical fiber 60 to achieve the desired optical gain. Nowhere does Garman teach or suggest directing the light with the optical fiber 60 to the electrical reflector 69 and reflecting the light with the electrical reflector back to another portion of the optical fiber 60.

As set forth on paragraph 39 of the above-identified patent application, with the system 10(3) an increase in resolution of near field optical imaging down to about 10 nm can be achieved. Accordingly, in view of the foregoing amendments and remarks, the Office is respectfully requested to reconsider and withdraw the rejection of claims 45 and 49. Since claims 46-48 depend from and contain the limitations of claim 45 and claims 50-52 depend from and contain the limitations of claim 49, they are distinguishable over the cited references and patentable in the same manner as claims 45 and 49.

In view of all of the foregoing, Applicants submit that this case is in condition for allowance and such allowance is earnestly solicited.

Respectfully submitted,

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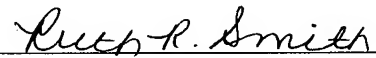
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